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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Ying-Hu

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EXAMINER

AHLUWALLA, NAVNEET K

ART UNIT

PAPER NUMBER

2166

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/810,756	<b>Applicant(s)</b> HU ET AL.	
	<b>Examiner</b> Navneet K. Ahluwalia	<b>Art Unit</b> 2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-47 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>04/2004 &amp; 10/2005</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. The application has been examined. Claims 1 – 47 are pending in this office action and claims 48 – 57 are cancelled in view of the election without traverse.

### ***Election/Restrictions***

2. Applicant's election without traverse of Group I comprising claims 1 - 47 in the reply filed on 01/12/2007 is acknowledged.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1 – 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Day et al. ('Day' herein after) (US 2005/0060293 A1) further in view of Depledge et al. ('Depledge' herein after) (US 5,884,307).

With respect to claim 1,

Day discloses a database management system having the improvement comprising: bitmap values, a bitmap value having a representation of a bitstring wherein set bits specify a set of objects whose definitions are built into the database management system, and user-accessible operations on the bitmap values (paragraph 0022, Day).

Day however does not disclose the representation of a bitstring explicitly as claimed.

Depledge teaches the bitmap value having a representation of a string of bits (Figure 4 and column 6 lines 21 – 38, Depledge)

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because both the references are directed in the same field of invention bitmapped indexing. Furthermore, the updating of the bitmapped indexes in Depledge would improve on the query performance with the use of the data tables (column 3 lines 8 – 31, Depledge).

Claims 2 – 21 are rejected under the same rationale given for claim 1. The citations of the elements claimed and taught are listed below.

With respect to claim 2,

Day as modified discloses the database management system set forth in claim 1 wherein the user-accessible operations comprise at least: a set-to-bitmap operation wherein a bitmap value is derived from a given set of the objects (paragraphs 0009 – 0010, Day).

With respect to claim 3,

Day as modified discloses the database management system set forth in claim 2 wherein: the derived bitmap value is a new bitmap value that specifies the objects in the given set (paragraph 0024, Day).

With respect to claim 4,

Day as modified discloses the database management system set forth in claim 2 wherein: the derived bitmap value is a preexisting bitmap value which now further specifies the objects in the given set (paragraph 0037, Day).

With respect to claim 5,

Day as modified discloses the database management system set forth in claim 2 wherein: the derived bitmap value is a preexisting bitmap value which now no longer specifies any objects in the given set (paragraph 0037, Day).

With respect to claim 6,

Day as modified discloses the database management system set forth in claim 1 wherein the user-accessible operations comprise at least: a bitmap-to-set operation wherein the set of the objects specified in a given bitmap value is derived from the given bitmap value (paragraph 0037, Day).

With respect to claim 7,

Day as modified discloses the database management system set forth in claim 1 wherein the user-accessible operations comprise at least: a bitmap-to-count operation wherein the number of the objects in the set specified in a given bitmap value is derived from the given bitmap value (column 5 lines 17 – 44, Depledge).

With respect to claim 8,

Day as modified discloses the database management system set forth in claim 1 wherein the user-accessible operations comprise at least: an existence operation wherein a value representing the logical value TRUE is returned when a given object belongs to the set of the objects represented by a given bitmap value (paragraph 0010, Day).

With respect to claim 9,

Day as modified discloses the database management system set forth in claim 1 wherein the user-accessible operations comprise at least: a logical operation on a first bitstring represented by a first bitmap value and a second bitstring represented by a second bitmap value (paragraph 0010, Day).

With respect to claim 10,

Day as modified discloses the database management system set forth in claim 1 wherein the user-accessible operations comprise at least: a comparison operation on a first bitmap value and a second bitmap value wherein a value representing the logical value TRUE is returned when the first bitmap value and the second bitmap value specify the same set of the objects (column 6 lines 59 – 67, Depledge).

With respect to claim 11,

Day as modified discloses the database management system set forth in claim 1 wherein: the bitmap values include settable bitmap values; and the user-accessible operations comprise at least an assignment operation which sets a target settable bitmap value from a source bitmap value (paragraph 0057, Day).

With respect to claim 12,

Day as modified discloses the database management system set forth in claim 1 wherein: the bitmap values include bitmap values that are persistent in the database management system (paragraph 0022, Day).

With respect to claim 13,

Day as modified discloses the database management system set forth in claim 12 wherein: the persistent bitmap values include bitmap values in fields of tables of the database management system (paragraph 0022, Day).

With respect to claim 14,

Day as modified discloses the database management system set forth in claim 1 wherein: the bitstring is compressed (column 7 lines 48 – 62, Depledge).

With respect to claim 15,

Day as modified discloses the database management system set forth in claim 1 wherein: the objects are identifiers for other objects that exist in the database management system (column 8 lines 1 – 11, Depledge).

With respect to claim 16,

Day as modified discloses the database management system set forth in claim 15 wherein: the identifiers for the other objects are row identifiers of rows in the database management system (column 8 lines 1 – 11, Depledge).

With respect to claim 17,



Day as modified discloses the database management system set forth in claim 16 wherein: the row identifiers are row identifiers returned by a user-defined query executed in the database management system (column 8 lines 1 – 11, Depledge).

With respect to claim 18,

Day as modified discloses the database management system set forth in claim 17 wherein: the query returns a row identifier when a field in the row has an attribute specified in the query, whereby the bitmap value represents the set of fields having the specified attribute (column 11 lines 24 – 37, Depledge).

With respect to claim 19,

Day as modified discloses the database management system set forth in claim 1 wherein: the objects are identifiers for other objects that exist outside the database management system (column 8 lines 1 – 11, Depledge).

With respect to claim 20,

Day as modified discloses the database management system set forth in claim 19 wherein: the identifiers for objects that exist outside the database management system are electronic product codes for product items (Figures 3 – 6, Depledge).

With respect to claim 21,

Day discloses a data storage device, the data storage device being characterized in that: the data storage device contains code which, when executed in a computer system, implements the database management system set forth in claim 1 (similar rejection as for claim 1).

With respect to claim 22,

Day discloses a bitmap value employed in a database management system, the bitmap value representing a first set of first objects, the first objects being external to the database management system and members of the first set being mapped onto a members of a second set of second objects that is defined in the database management system (paragraph 0015, Day), and the bitmap value comprising: a mapping specifier that maps a string of bits to a subset of the second set (paragraph 0028, Day); and a representation of the string of bits wherein a bit is set in the represented string of bits when the member of the second set that is mapped to the bit has a member of the first set mapped thereto (paragraph 0022, Day).

Day however does not disclose the representation of a bitstring explicitly as claimed.

Depledge teaches the bitmap value having a representation of a string of bits (Figure 4 and column 6 lines 21 – 38, Depledge)

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because both the references are directed in the same field of invention bitmapped indexing.

Furthermore, the updating of the bitmapped indexes in Depledge would improve on the query performance with the use of the data tables (column 3 lines 8 – 31, Depledge)

Claims 23 – 35 are rejected under the same rationale given for claim 22. The citations of the elements claimed and taught are listed below.

With respect to claim 23,

Day as modified discloses the bitmap value set forth in claim 22 wherein: the second set is ordered (paragraphs 0009 – 0010, Day).

With respect to claim 24,

Day as modified discloses the bitmap value set forth in claim 23 wherein: the order of the members of the second ordered set corresponds to values of the members thereof; the mapping specifier specifies the mapping by specifying one or more ranges of the values of the members of the second ordered set to which the string of bits is mapped; and the representation of the string of bits represents strings of bits corresponding to the ranges (paragraph 0024, Day).

With respect to claim 25,

Day as modified discloses the bitmap value set forth in claim 24 wherein: the mapping specifier specifies the range of the values by specifying a start value and an end value (paragraph 0037, Day).

With respect to claim 26,

Day as modified discloses the bitmap value set forth in claim 24 wherein: the values include a prefix which determines a range of the values; and the mapping specifier specifies the range of the values by specifying the prefix for the range (paragraph 0037, Day).

With respect to claim 27,

Day as modified discloses the bitmap value set forth in claim 26 wherein: the mapping specifier further specifies the range of the values by using a start value and an end value to specify one or more subranges of the range specified by the prefix (paragraph 0037, Day).

With respect to claim 28,

Day as modified discloses the bitmap value set forth in claim 24 wherein: the objects in the second ordered set are identifiers for objects in the first set (column 5 lines 17 – 44, Depledge).

With respect to claim 29,

Day as modified discloses the bitmap value set forth in claim 28 wherein: the identifiers for objects in the first set are electronic product codes for the objects items (Figures 3 – 6, Depledge).

With respect to claim 30,

The bitmap value set forth in claim 22 wherein: there is a plurality of the bitmap values in the database management system; and certain of the bitmap values are persistent in the database management system (column 8 lines 1 – 11, Depledge).

With respect to claim 31,

Day as modified discloses the bitmap values set forth in claim 30 wherein: the persistent bitmap values include bitmap values in fields of tables of the database management system (column 8 lines 1 – 11, Depledge).

With respect to claim 32,

Day as modified discloses the bitmap value set forth in claim 22 wherein: the representation of the bitstring is a compressed representation thereof (column 7 lines 48 – 62, Depledge).

With respect to claim 33,

Day as modified discloses the bitmap value set forth in claim 22 wherein: there is a plurality of the bitmap values in the database management system; and the database management system provides a plurality of user-accessible operations on the bitmap values (column 11 lines 24 – 37, Depledge).

With respect to claim 34,

Day as modified discloses the bitmap value set forth in claim 33 wherein: certain of the user-accessible operations alter the range specifier and the representation of the bitstring as required to map the represented string of bits to a subset of the second set that is required for the operation (column 11 lines 24 – 37, Depledge).

With respect to claim 35,

Day discloses a data storage device, the data storage device being characterized in that: the data storage device contains code which, when executed in a computer system, implements the bitmap value set forth in claim 22 (similar rejection as for claim 22).

With respect to claim 36,

Day discloses a method employed in a database system of making a bitmap value that represents a first set of objects external to the database system, the method comprising the steps performed in the database system of: mapping the objects onto a second ordered set of identifiers defined in the database management system (paragraph 0015, Day); mapping a bitstring that is represented in the bitmap value onto a subset of the second set that includes the identifiers onto which the objects have been mapped (paragraph 0028, Day); and setting the bits in the bitstring that correspond to the identifiers onto which the objects have been mapped (paragraph 0022, Day).

Day however does not disclose the representation of a bitstring explicitly as claimed.

Depledge teaches the bitmap value having a representation of a string of bits (Figure 4 and column 6 lines 21 – 38, Depledge)

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because both the references are directed in the same field of invention bitmapped indexing. Furthermore, the updating of the bitmapped indexes in Depledge would improve on the query performance with the use of the data tables (column 3 lines 8 – 31, Depledge).

Claims 37 – 43 are rejected under the same rationale given for claim 36. The citations of the elements claimed and taught are listed below.

With respect to claim 37,

Day as modified discloses the method set forth in claim 36 wherein: in the step of mapping the objects, the identifiers in the second set are identical with identifiers that are employed externally to the database system to identify the objects (column 8 lines 1 – 11, Depledge).

With respect to claim 38,

Day as modified discloses the method set forth in claim 37 wherein: in the second set, the identifiers are electronic product codes (Figures 3 – 6, Depledge).

With respect to claim 39,

Day as modified discloses the method set forth in claim 36 wherein the step of mapping a bitstring comprises the steps of: making a range specifier that specifies a range of the ordered set of identifiers that includes the identifiers into which the objects have been mapped; and mapping the bits in the bitstring to the specified range (paragraph 0024, Day).

With respect to claim 40,

Day as modified discloses the method set forth in claim 39 wherein the step of making a range specifier includes the step of: making a start value and an end value which together specify the range (paragraph 0037, Day).

With respect to claim 41,

Day as modified discloses the method set forth in claim 39 wherein the step of making a range specifier includes the step of making a prefix value which specifies the range (paragraph 0037, Day).

With respect to claim 42,

Day as modified discloses the method set forth in claim 36 further comprising the step of: compressing the bitstring (column 7 lines 48 – 62, Depledge).



With respect to claim 43,

Day discloses a data storage device, the data storage device being characterized in that: the data storage device contains code which, when executed in a computer system, implements the method set forth in claim 36 (similar rejection as for claim 36).

With respect to claim 44,

Day discloses a bitmap value employed in a database management system to represent a first subset of the row identifiers defined in the database management system, the bitmap value comprising: a mapping specifier that maps a string of bits to a second subset of the set of row identifiers (paragraph 0015, Day); and a representation of the string of bits wherein a bit is set in the represented string of bits when the member of the second subset that is mapped to the bit corresponds to a member of the first subset (paragraph 0028, Day); and the first subset is returned by a user-defined query executed by the database management system (paragraph 0022, Day).

Day however does not disclose the representation of a bitstring explicitly as claimed.

Depledge teaches the bitmap value having a representation of a string of bits (Figure 4 and column 6 lines 21 – 38, Depledge)

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because both the references are directed in the same field of invention bitmapped indexing.

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Furthermore, the updating of the bitmapped indexes in Depledge would improve on the query performance with the use of the data tables (column 3 lines 8 – 31, Depledge).

Claims 45 – 47 are rejected under the same rationale given for claim 44. The citations of the elements claimed and taught are listed below.

With respect to claim 45,

Day as modified discloses the bitmap value set forth in claim 44 wherein: the database management system dynamically alters the mapping specifier and the representation of the string of bits as required to map the representation of the string of bits to a second subset of the row identifiers that includes the first subset of the row identifiers (column 8 lines 1 – 11, Depledge).

With respect to claim 46,

Day as modified discloses the bitmap value set forth in claim 44 wherein: the query returns a row identifier when a field in the row identified by the row identifier has an attribute specified in the query, whereby the bitmap value represents the set of fields whose values have the specified attribute (paragraph 0024, Day).

With respect to claim 47,

Day discloses a data storage device, the data storage device being characterized in that: the data storage device contains code which, when executed in a computer system, implements the method set forth in claim 44 (similar rejection as for claim 44).

**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Navneet K. Ahluwalia whose telephone number is 571-272-5636.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alam T. Hosain can be reached on 571-272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*Navneet*

Navneet K. Ahluwalia  
Examiner  
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Dated: 03/05/2007